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Ohata et al.

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(54) **IMAGE FORMING APPARATUS COMPRISING CONNECTING MECHANISM CONFIGURED TO ELECTRICALLY CONNECT HIGH-VOLTAGE BOARD AND UNIT**

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(30) **Foreign Application Priority Data**

Oct. 7, 2014 (JP) 2014-206611

(51) **Int. Cl.**

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G03G 21/18	(2006.01)
G03G 21/16	(2006.01)
H01B 5/04	(2006.01)

(52) **U.S. Cl.**

CPC ***G03G 15/80*** (2013.01); ***G03G 21/1652*** (2013.01); ***G03G 21/1867*** (2013.01); *H01B 5/04* (2013.01)

(58) **Field of Classification Search**

CPC G03G 15/80; G03G 21/1867; G03G 21/1652; H01B 5/04

See application file for complete search history.

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(57) **ABSTRACT**

An image forming apparatus includes a unit, a high-voltage board and a connecting mechanism. The connecting mechanism includes a first connecting member, a first holding member, a coupling member and a second connecting member. The first connecting member includes a first spring terminal. The first spring terminal includes a first large diameter part and a first small diameter part. The first holding member has a first contact part coming into contact with an end part of the first small diameter part at a side of the first large diameter part in a state where the first holding member is coupled with the coupling member. The coupling member has a second contact part coming into contact with an end part of the first large diameter part at a side of the first small diameter part in the state where the first holding member is coupled with the coupling member.

8 Claims, 12 Drawing Sheets

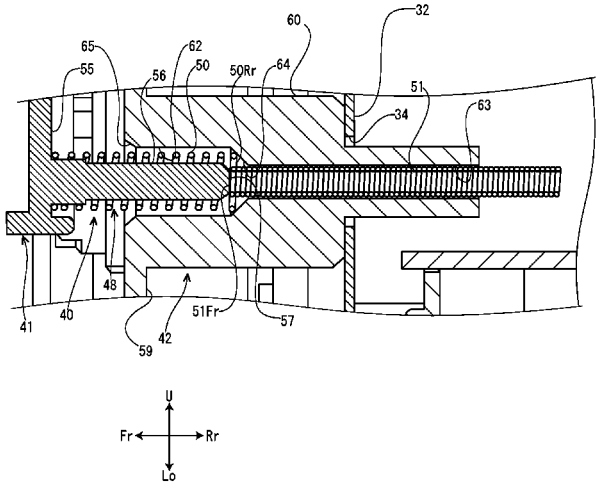
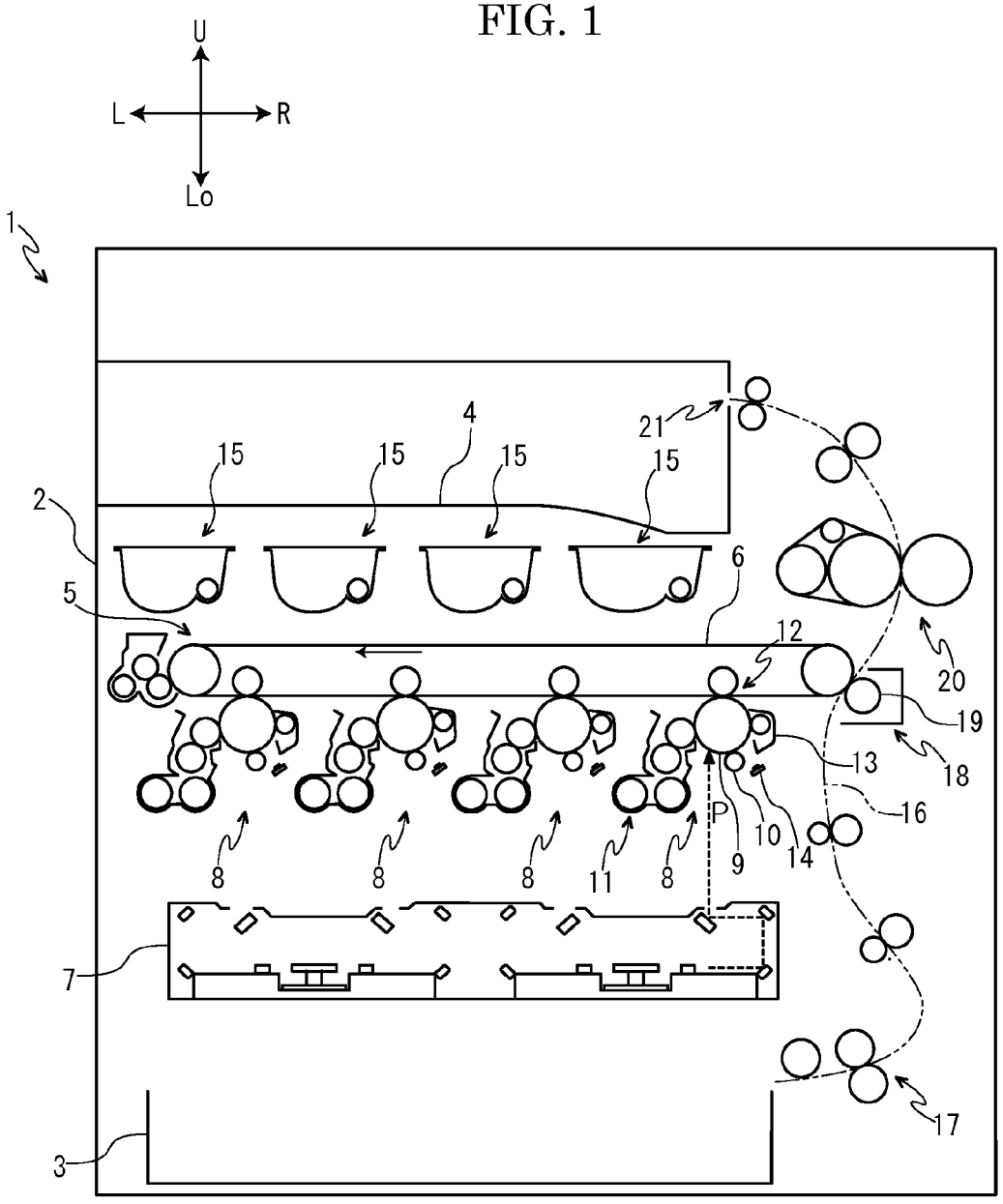
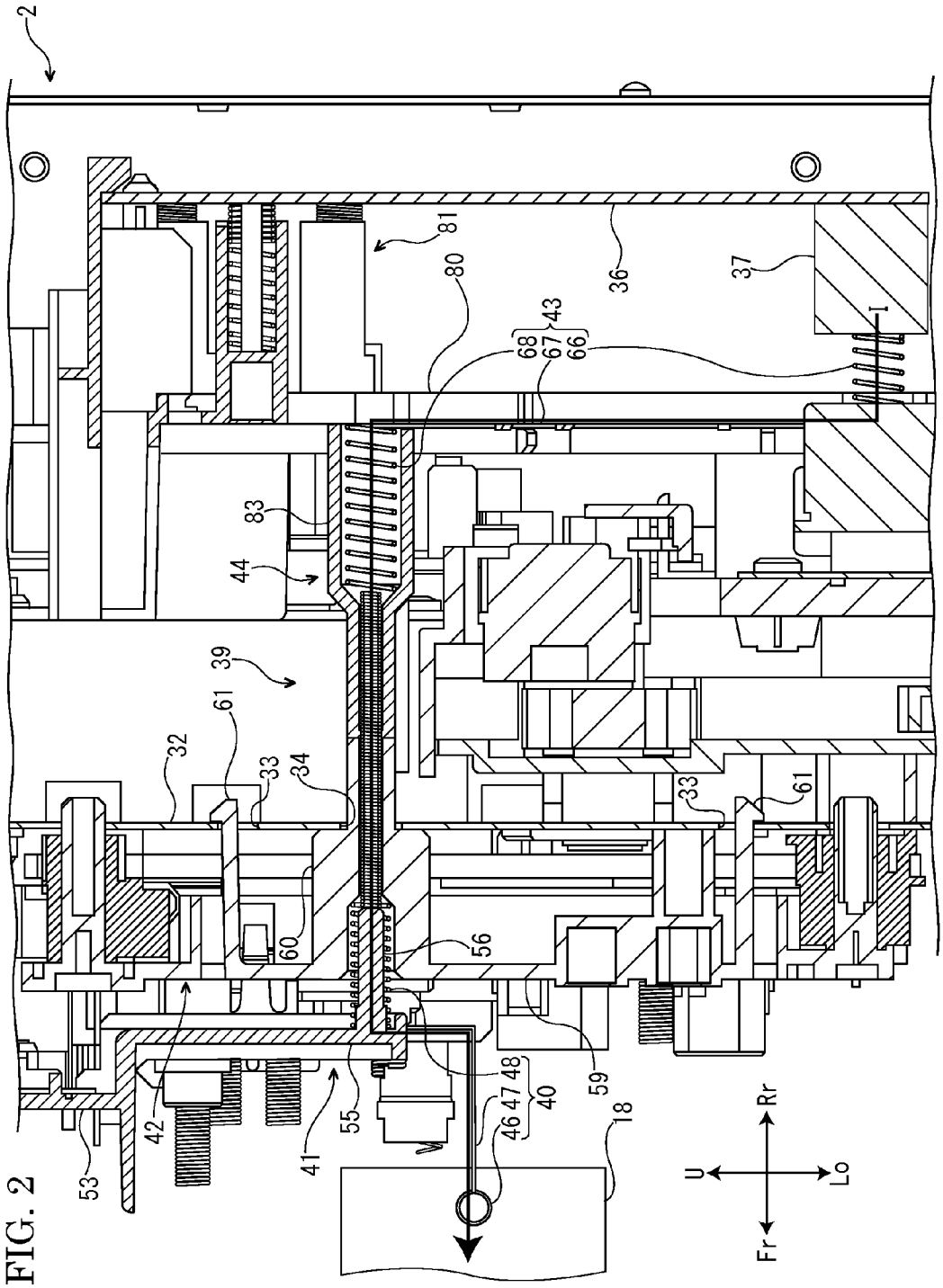


FIG. 1

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55
53
18
Rr
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Fr
U

FIG. 2

FIG. 3

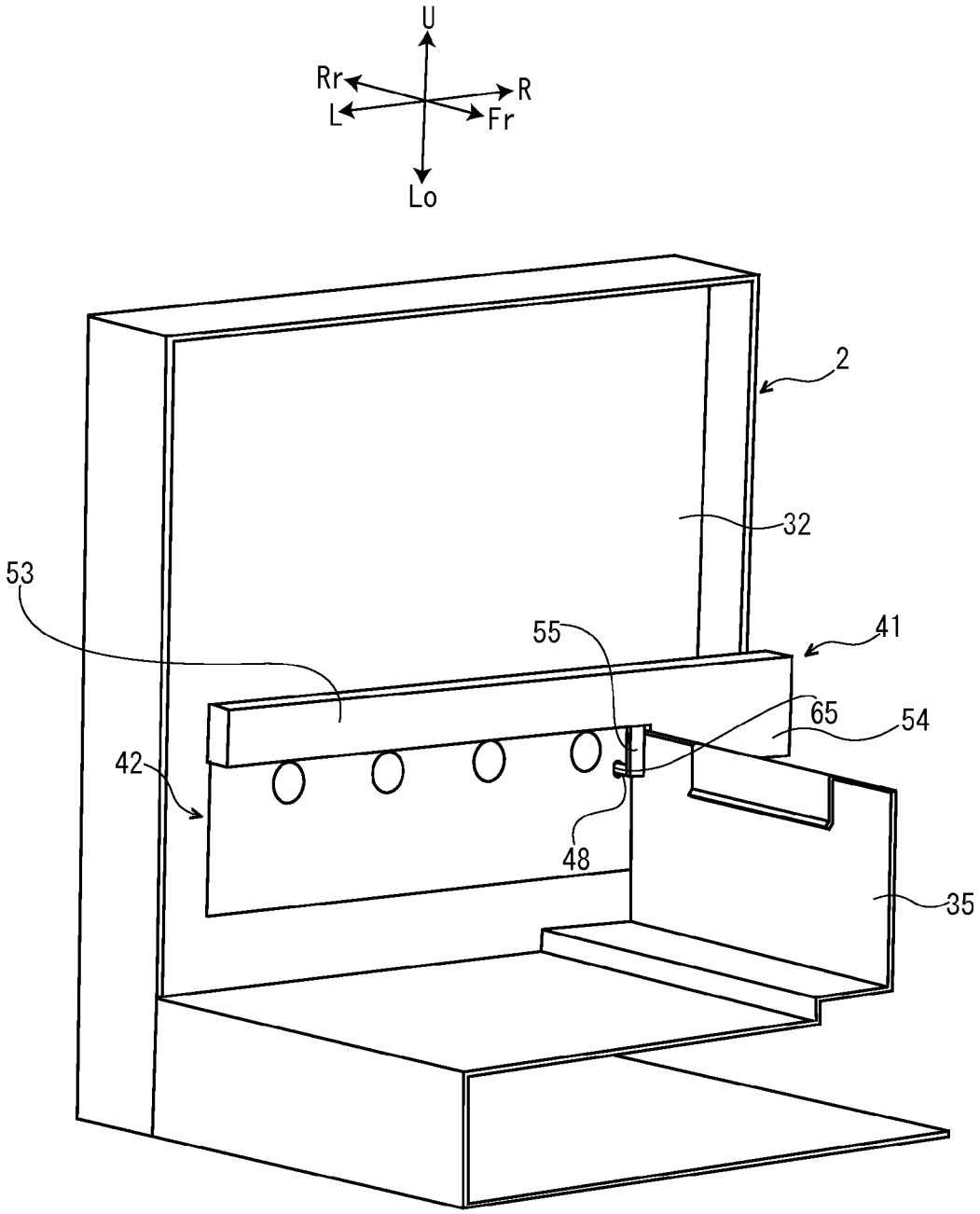
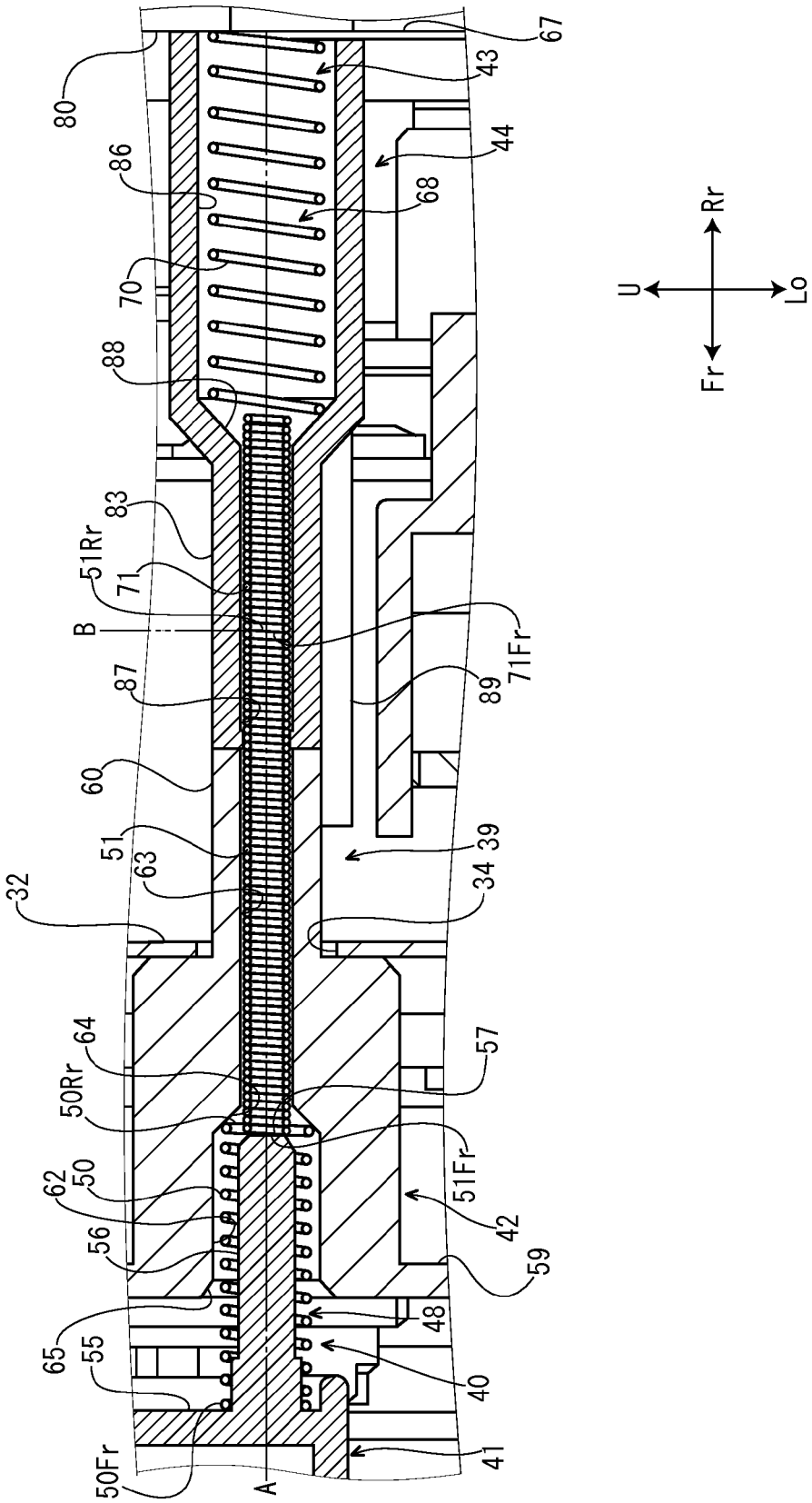


FIG. 4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A
67
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FIG. 5

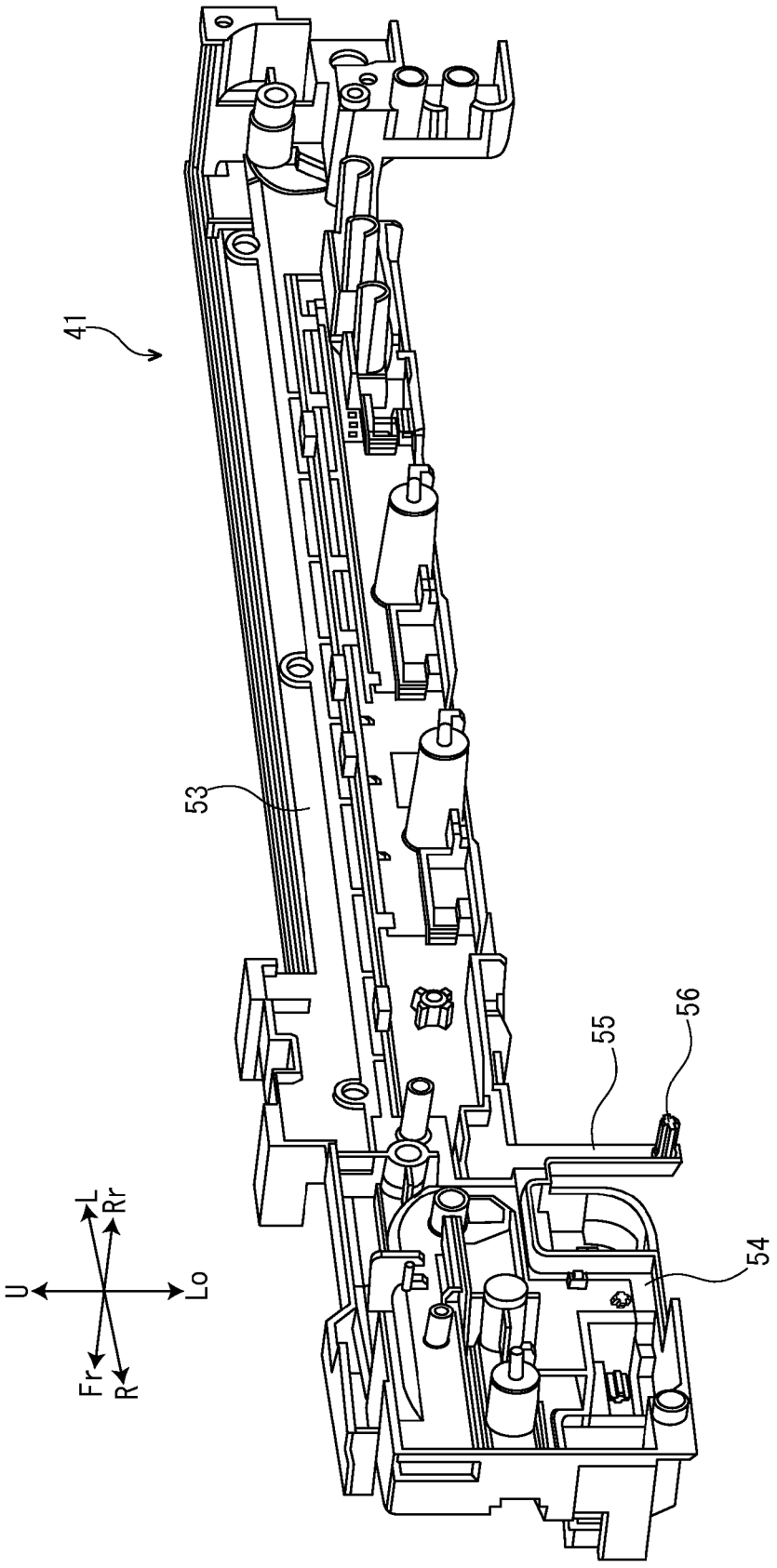

FIG. 6

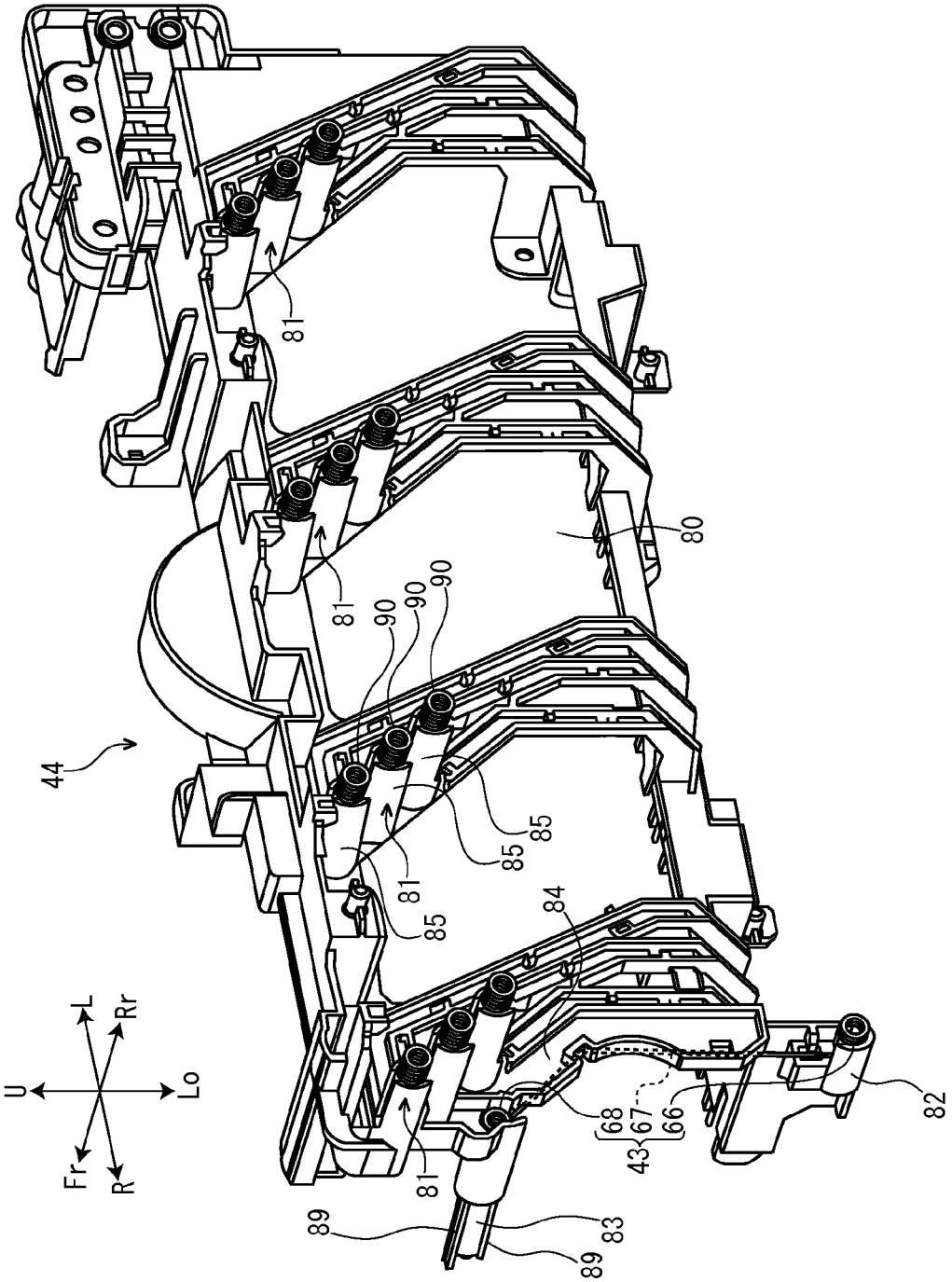

FIG. 7

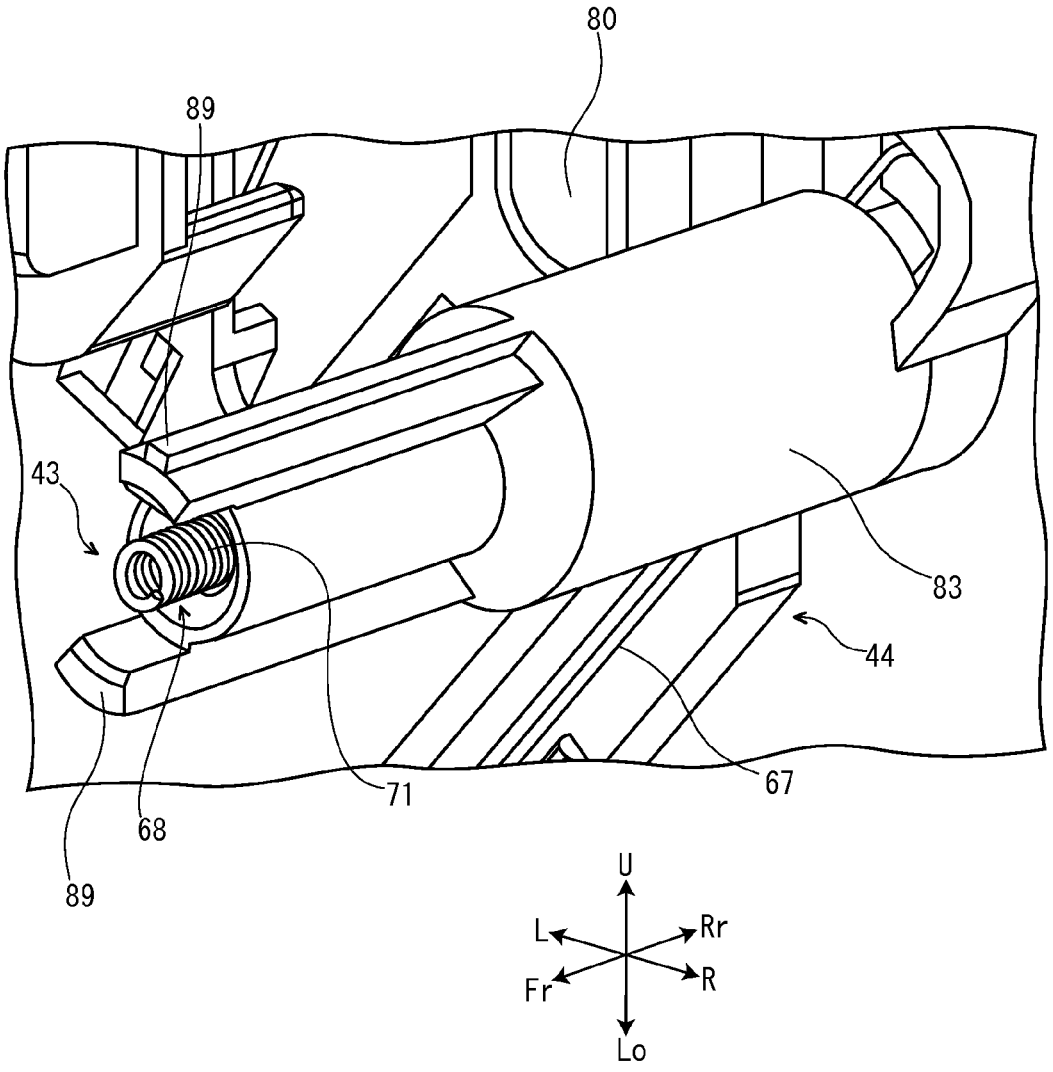

FIG. 8

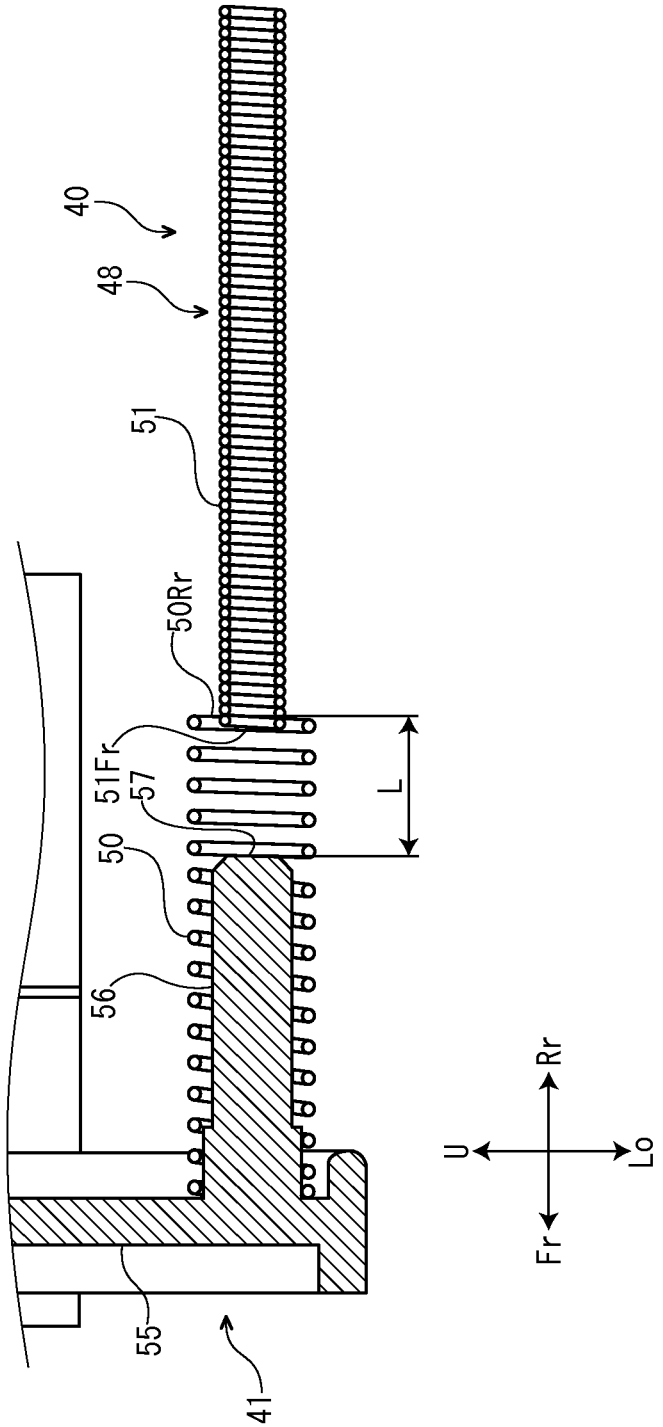

FIG. 9

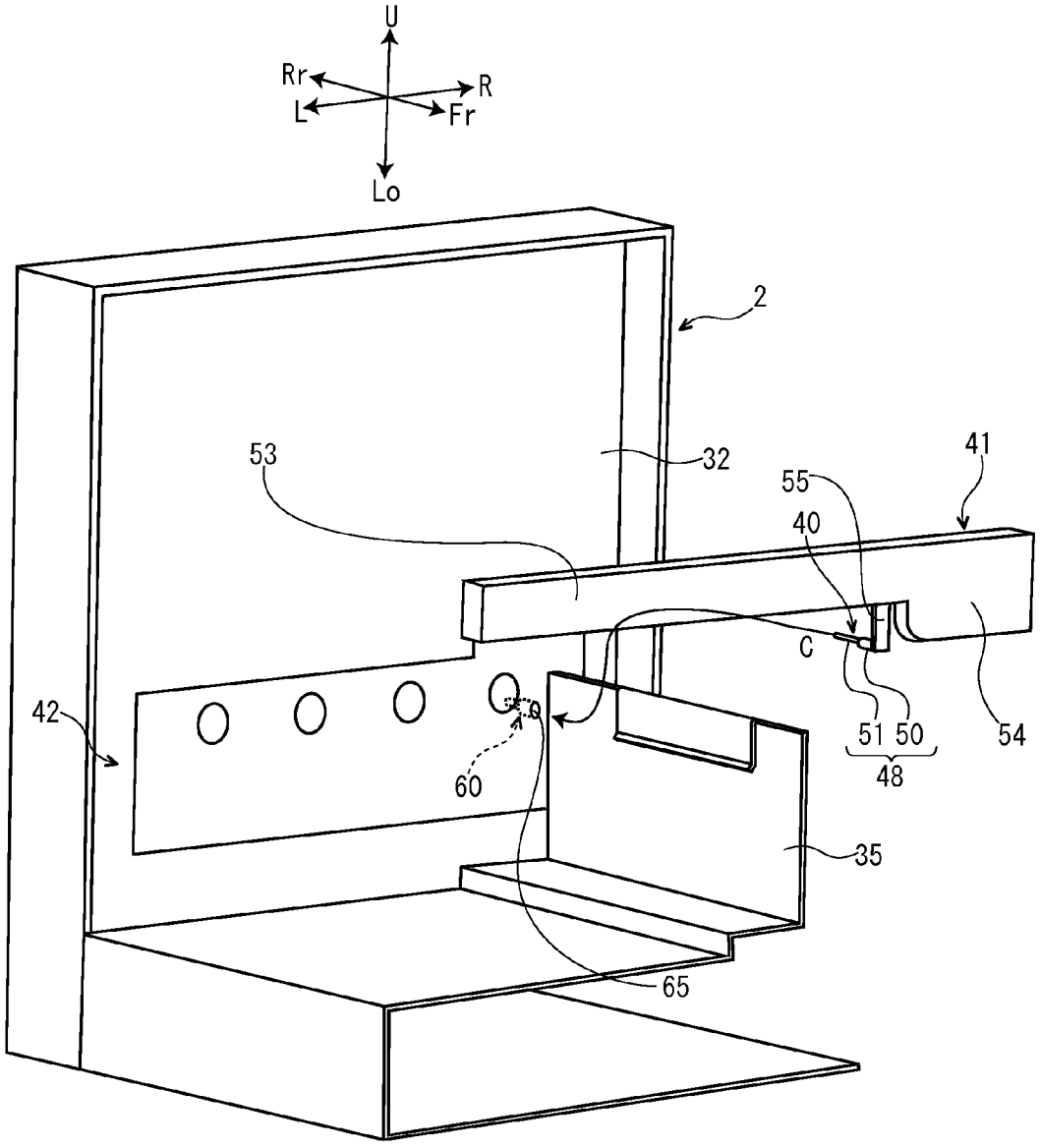

FIG. 10

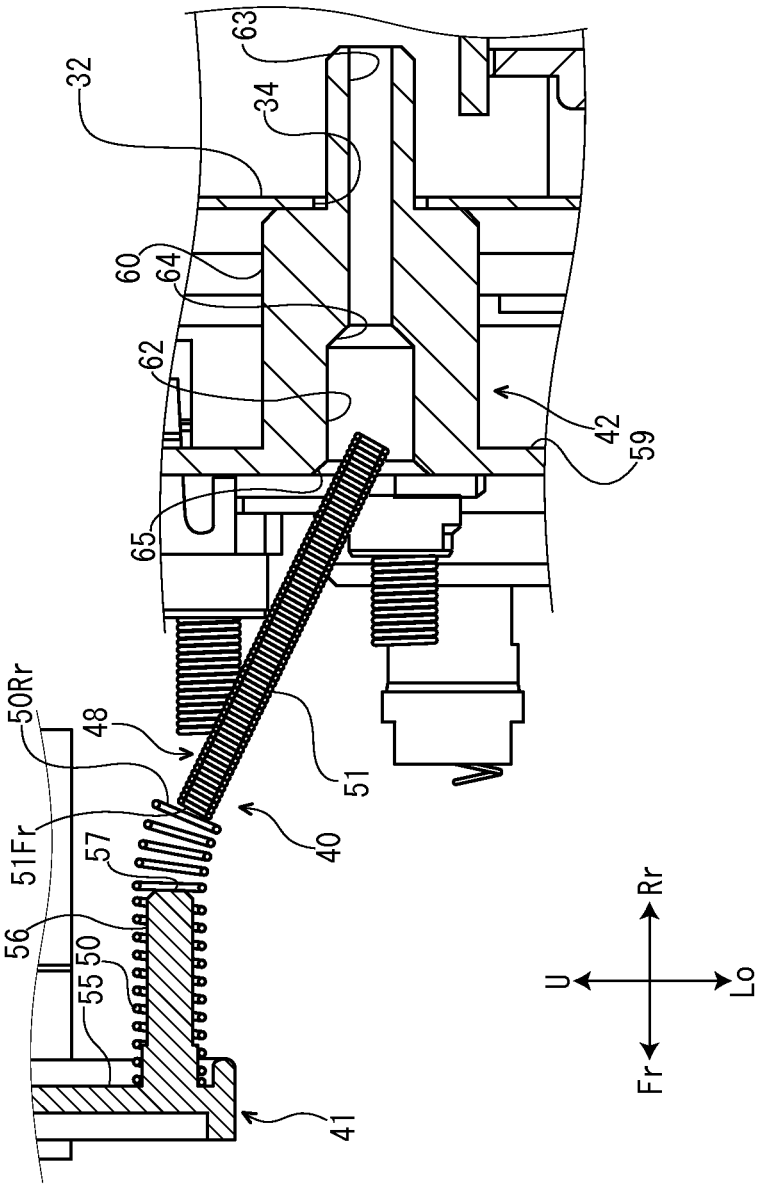

FIG. 11

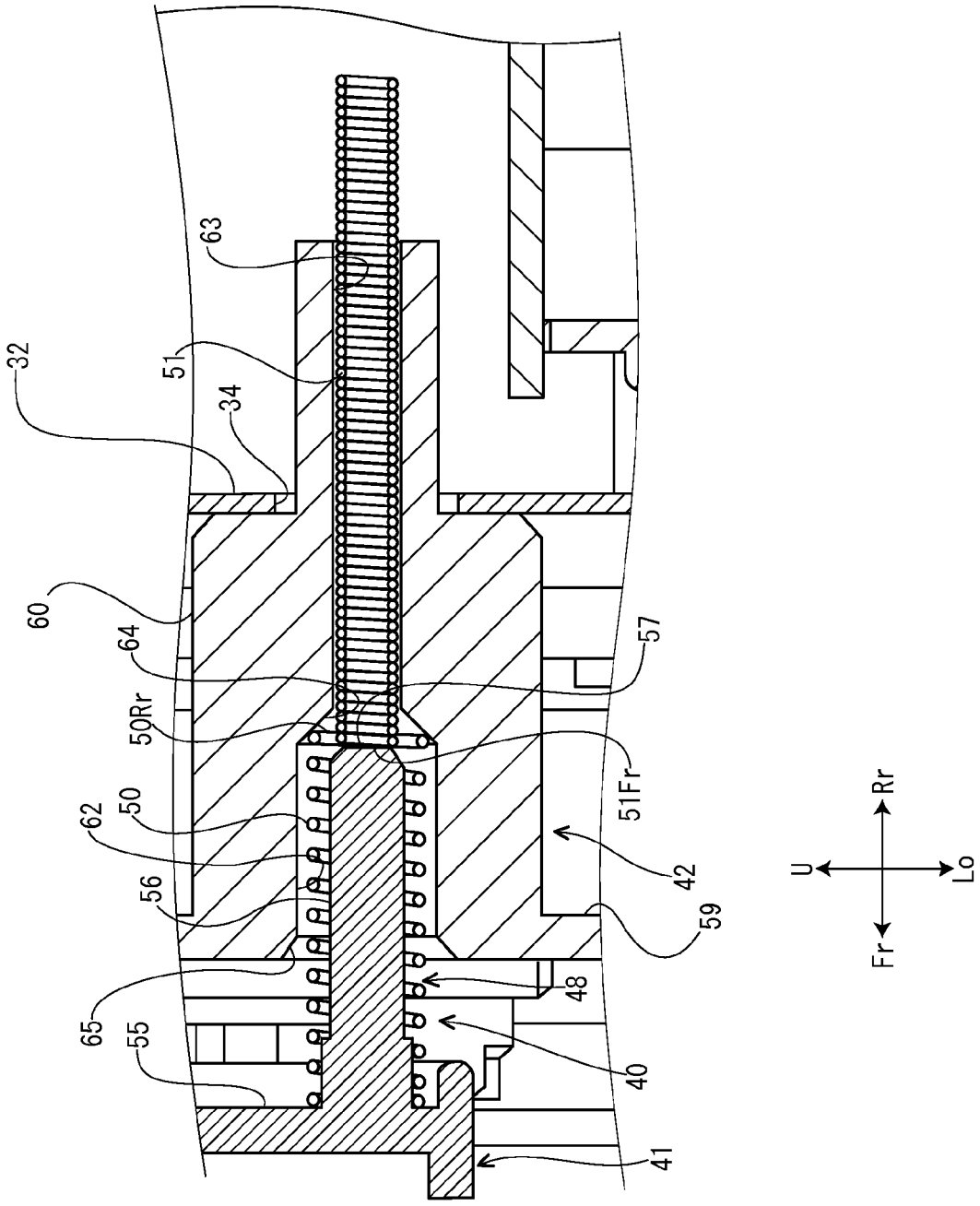

FIG. 12

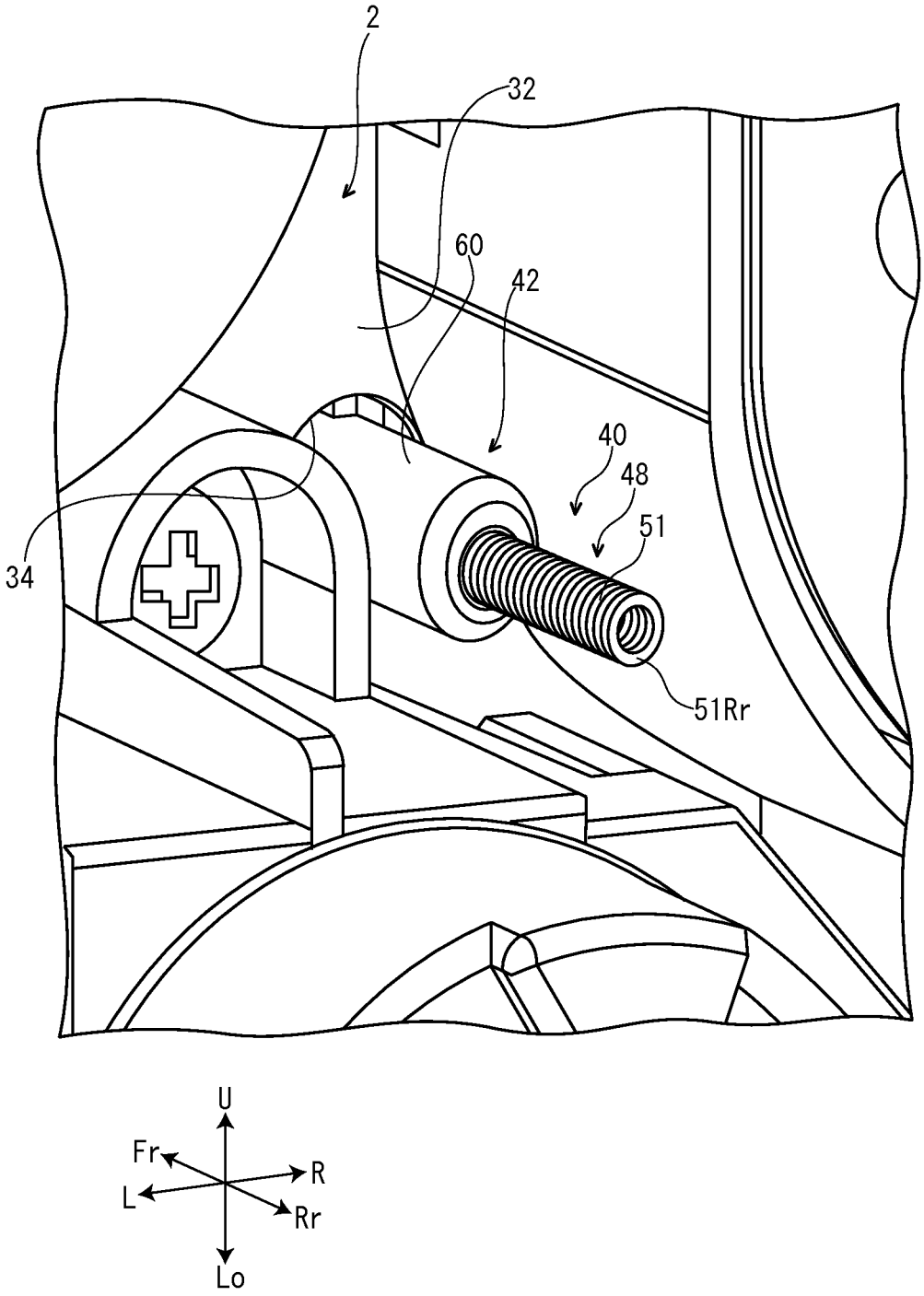

IMAGE FORMING APPARATUS COMPRISING CONNECTING MECHANISM CONFIGURED TO ELECTRICALLY CONNECT HIGH-VOLTAGE BOARD AND UNIT

INCORPORATION BY REFERENCE

This application is based on and claims the benefit of priority from Japanese patent application No. 2014-206611 filed on Oct. 7, 2014, the entire contents of which are incorporated herein by reference.

BACKGROUND

The present disclosure relates to an electrographic image forming apparatus.

Conventionally, an electrographic image forming apparatus includes various units, such as a photosensitive drum unit, a developing unit and a transferring unit, and so on. These units are used for an image forming process on a recording medium.

For example, an image forming apparatus, which includes a unit used for an image forming process on a recording medium, a high-voltage board configured to supply a high-voltage current to the unit and a connecting mechanism configured to connect the high-voltage board and the unit, is known.

There is a case that a high-voltage contact is formed by a pair of spring terminals at an inside of the connecting mechanism. In such a case, it is necessary to consider the spring pressures of both spring terminals when the pressure of the high-voltage contact is set and it is difficult to set the pressure of the high-voltage contact easily and precisely.

SUMMARY

In accordance with an embodiment of the present disclosure, an image forming apparatus includes a unit, a high-voltage board and a connecting mechanism. The unit is used for an image forming process on a recording medium. The high-voltage board is configured to supply a high-voltage current to the unit. The connecting mechanism is configured to electrically connect the high-voltage board and the unit. The connecting mechanism includes a first connecting member, a first holding member, a coupling member and a second connecting member. The first connecting member includes a first spring terminal. The first holding member is configured to hold the first connecting member. With the coupling member, the first holding member is coupled. The second connecting member includes a second spring terminal configured to be contactable with the first spring terminal. The first spring terminal includes a first large diameter part and a first small diameter part. The first large diameter part is composed of a compressible coil spring. The first small diameter part is composed of a tightly wound coil spring, has a smaller outer diameter than the first large diameter part and is configured to be contactable with the second spring terminal. The first holding member has a first contact part configured to come into contact with an end part of the first small diameter part at a side of the first large diameter part in a state where the first holding member is coupled with the coupling member. The coupling member has a second contact part configured to come into contact with an end part of the first large diameter part at a side of the first small diameter part in the state where the first holding member is coupled with the coupling member.

The above and other objects, features, and advantages of the present disclosure will become more apparent from the following description when taken in conjunction with the accompanying drawings in which a preferred embodiment of the present disclosure is shown by way of illustrative example.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram showing an outline of a configuration of a color printer according to an embodiment of the present disclosure.

FIG. **2** is a sectional view showing a connecting mechanism and its periphery, in the color printer according to the embodiment of the present disclosure.

FIG. **3** is a perspective view schematically showing a printer main body, a first holding member and a coupling member, in the color printer according to the embodiment of the present disclosure.

FIG. **4** is a sectional view showing first and second spring terminals and their periphery, in the color printer according to the embodiment of the present disclosure.

FIG. **5** is a perspective view showing the first holding member, in the color printer according to the embodiment of the present disclosure.

FIG. **6** is a perspective view showing a second connecting member and a second holding member, in the color printer according to the embodiment of the present disclosure.

FIG. **7** is a perspective view showing the second spring terminal and its periphery, in the color printer according to the embodiment of the present disclosure.

FIG. **8** is a sectional view showing the first spring terminal and its periphery in a state before the first holding member is coupled with the coupling member, in the color printer according to the embodiment of the present disclosure.

FIG. **9** is a perspective view schematically showing the printer main body, the first holding member and the coupling member in the state before the first holding member is coupled with the coupling member, in the color printer according to the embodiment of the present disclosure.

FIG. **10** is a sectional view showing the first spring terminal and its periphery in a state right before the first holding member is coupled with the coupling member, in the color printer according to the embodiment of the present disclosure.

FIG. **11** is a sectional view showing the first spring terminal and its periphery in a state where the first holding member is coupled with the coupling member, in the color printer according to the embodiment of the present disclosure.

FIG. **12** is a perspective view showing the first spring terminal and its periphery in a state where the first holding member is coupled with the coupling member, in the color printer according to the embodiment of the present disclosure.

DETAILED DESCRIPTION

Firstly, with reference to FIG. **1**, the entire structure of a color printer **1** (an image forming apparatus) will be described. Hereinafter, a near side of FIG. **1** will be described as a front side of the color printer **1**, for convenience of explanation. Arrows Fr, Rr, L, R, U and Lo of each figure indicate a front side, a rear side, a left side, a right side, an upper side and a lower side of the color printer **1**, respectively.

The color printer **1** includes a box-formed printer main body **2** (apparatus main body). In a lower part of the printer main body **2**, a sheet feeding cartridge **3** storing a sheet (a recording medium) is arranged. In an upper part of the printer main body **2**, an ejected sheet tray **4** is arranged.

In a middle part of the printer main body **2**, an intermediate transferring unit **5** is arranged. The intermediate transferring unit **5** is provided with an intermediate transferring belt **6** (image carrier) disposed around a plurality of rollers. Below the intermediate transferring belt **6**, an exposure device **7** composed of a laser scanning unit (LSU) is arranged. At a lower side of the intermediate transferring belt **6**, four image forming parts **8** are arranged for respective colors (e.g. four colors of magenta, cyan, yellow and black) of a toner. In each image forming part **8**, a photosensitive drum **9** is rotatably arranged. Around the photosensitive drum **9**, a charger **10**, a developing device **11**, a primary transferring part **12**, a cleaning device **13** and a static eliminator **14** are located in order of first transferring processes. Above the developing device **11**, toner containers **15** corresponding to the respective image forming parts **8** are arranged for the respective colors (e.g. four colors of magenta, cyan, yellow and black) of toner.

At a right side part of the printer main body **2**, a conveying path **16** for the sheet is arranged in upper and lower direction. At an upstream end of the conveying path **16**, a sheet feeding part **17** is arranged. At an intermediate stream part of the conveying path **16**, a secondary transferring unit **18** (unit) is arranged at a right end side of the intermediate transferring belt **6**. The secondary transferring unit **18** includes a secondary transferring roller **19**. At a downstream part of the conveying path **16**, a fixing device **20** is arranged. At a downstream end of the conveying path **16**, a sheet ejection port **21** is arranged.

Next, an image forming process on the sheet in the color printer **1** having such a configuration will be described.

When the power is supplied to the color printer **1**, various parameters are initialized and initial determination, such as temperature determination of the fixing device **20**, is carried out. Subsequently, when image data is inputted and a printing start is directed from a computer or the like connected with the color printer **1**, the image forming process on the sheet is carried out as follows.

Firstly, the surface of the photosensitive drum **9** is electrically charged by the charger **10**. Then, an electrostatic latent image is formed on the surface of the photosensitive drum **9** by a laser light (refer to an arrow P) from the exposure device **7**. The electrostatic latent image is developed to a toner image in the developing device **11** by the toner supplied from each toner container **15**. The toner image is primarily transferred to the surface of the intermediate transferring belt **6** in the primary transferring part **12**. The above-mentioned operation is repeated in order by the respective image forming parts **8**, thereby forming the toner image of full color on the intermediate transferring belt **6**. Incidentally, toner and electric charge remained on the photosensitive drum **9** are removed by the cleaning device **13** and the static eliminator **14**.

On the other hand, the sheet fed from the sheet feeding cartridge **3** or a manual bypass tray (not shown) by the sheet feeding part **17** is conveyed to the secondary transferring unit **18**. Then, by the secondary transferring roller **19** of the secondary transferring unit **18**, the toner image of full color on the intermediate transferring belt **6** is secondary transferred to the sheet. The sheet with the secondary transferred toner image is conveyed to a downstream side on the conveying path **16** to enter the fixing device **20**, and then, the toner image is fixed on the sheet in the fixing device **20**. The sheet with the fixed toner image is ejected from the sheet ejection port **21** on the ejected sheet tray **4**.

Next, the printer main body **2** will be further described. In the printer main body **2**, the secondary transferring unit **18** is housed.

As shown in FIG. **2**, at a rear part of the printer main body **2**, a rear side frame **32** is set up. The rear side frame **32** is provided with a pair of upper and lower hook holes **33**, and, below the upper hook hole **33**, a through hole **34** is formed. As shown in FIG. **3**, at a front right side of the rear side frame **32**, a side plate **35** is set up. The side plate **35** extends along front and rear direction.

Next, a high-voltage board **36** disposed in the printer main body **2** will be described.

As shown in FIG. **2**, the high-voltage board **36** is set up at a rear side of the rear side frame **32** of the printer main body **2**. The high-voltage board **36** is connected with a power supply board (not shown) connected to an external power supply. At a lower end part of the high-voltage board **36**, a secondary transferring transformer **37** is provided.

Next, a connecting mechanism **39** which electrically connects the high-voltage board **36** and the secondary transferring unit **18** will be described.

As shown in FIG. **2**, the connecting mechanism **39** includes a first connecting member **40**, a first holding member **41** which holds the first connecting member **40**, a coupling member **42** which is arranged at a rear side of the first holding member **41**, a second connecting member **43** which is arranged at a rear side of the first connecting member **40** and a second holding member **44** which holds the second connecting member **43**.

The first connecting member **40** is formed by using a conductive metal wire, for example. As shown in FIG. **2**, the first connecting member **40** includes a unit-side spring terminal **46**, a first spring terminal **48** which is arranged at a rear side of the unit-side spring terminal **46**, and a first conductive wire **47** which connects the unit-side spring terminal **46** and the first spring terminal **48**.

The unit-side spring terminal **46** is composed of a compressible coil spring. The unit-side spring terminal **46** is elongated in left and right direction (a depth direction in FIG. **2**). The unit-side spring terminal **46** is in contact with the secondary transferring unit **18**.

As shown in FIG. **4** and others, the first spring terminal **48** is provided around an axial center A elongated in the front and rear direction. That is, in the present embodiment, the axial center direction of the first spring terminal **48** is the front and rear direction. The first spring terminal **48** includes a first large diameter part **50** and a first small diameter part **51** which is provided at a rear side of the first large diameter part **50** so as to continue to the first large diameter part **50**. The first large diameter part **50** is composed of a coil spring which is not tightly wound (a coil spring whose winding parts are separated from each other), and compressible in the front and rear direction. The first small diameter part **51** is composed of a tightly wound coil spring (a coil spring whose winding parts are in contact with each other), and is not compressible in the front and rear direction. The first small diameter part **51** has a smaller outer diameter than the first large diameter part **50**.

The first holding member **41** is made of a resin having a high electric insulating property, for example. As shown in FIG. **5**, the first holding member **41** includes a first holding member main body **53** which is elongated in the left and right direction, an extending part **54** which extends downward from a right end part of the first holding member main

body **53** along the upper and lower direction, a holding plate part **55** which extends downward from a right side part of the first holding member main body **53** along the upper and lower direction, and a boss part **56** which extends backward from a lower end part of the holding plate part **55** along the front and rear direction.

As shown in FIG. **4**, a front end part **50**Fr of the first large diameter part **50** of the first spring terminal **48** comes into contact with the holding plate part **55**. The outer diameter of the boss part **56** is smaller than the outer diameter of the first large diameter part **50** of the first spring terminal **48**, and is larger than the outer diameter of the first small diameter part **51** of the first spring terminal **48**. To an outer circumference of the boss part **56**, the first large diameter part **50** of the first spring terminal **48** is attached. On a rear end face (distal end face) of the boss part **56**, the first contact part **57** is provided.

The coupling member **42** is made of a resin having a high electric insulating property, for example. As shown in FIG. **2**, the coupling member **42** includes a coupling member main body **59**, and a cylindrical first housing **60** which extends backward from the coupling member main body **59** along the front and rear direction.

The coupling member main body **59** includes a pair of upper and lower hooks **61**. Each hook **61** engages with each hook hole **33** provided at the rear side frame **32** of the printer main body **2**. Thus, the coupling member **42** is fixed to the rear side frame **32** of the printer main body **2**.

The first housing **60** penetrates the through hole **34** formed at the rear side frame **32** of the printer main body **2**. As shown in FIG. **4**, the first housing **60** includes a first insertion part **62**, a second insertion part **63** which is provided at a rear side of the first insertion part **62** and a second contact part **64** which is arranged between the first insertion part **62** and the second insertion part **63**. In the first insertion part **62**, the first large diameter part **50** of the first spring terminal **48** and the boss part **56** of the first holding member **41** are partially inserted. At a front end part of the first insertion part **62**, an opening part **65** is formed. In the second insertion part **63**, the first small diameter part **51** of the first spring terminal **48** is partially inserted. The second insertion part **63** has an inner diameter smaller than the first insertion part **62**. The diameter of the second contact part **64** is gradually reduced toward the rear side (toward the side of the second insertion part **63**).

The second connecting member **43** is formed by using a conductive metal wire, for example. As shown in FIG. **2**, the second connecting member **43** includes a board side spring terminal **66**, a second spring terminal **68** which is arranged at a front side of the board side spring terminal **66**, and a second conductive wire **67** which connects the board side spring terminal **66** and the second spring terminal **68**.

The board side spring terminal **66** is composed of a compressible coil spring. The board side spring terminal **66** extends along the front and rear direction. The board side spring terminal **66** is in contact with the secondary transferring transformer **37** of the high-voltage board **36**.

As shown in FIG. **4**, similar to the first spring terminal **48** of the first connecting member **40**, the second spring terminal **68** is provided around the axial center A extending in the front and rear direction. That is, the second spring terminal **68** is arranged coaxially with the first spring terminal **48**. The second spring terminal **68** includes a second large diameter part **70** and a second small diameter part **71** which is provided at a front side of the second large diameter part **70** so as to continue to the second large diameter part **70**. The second large diameter part **70** is composed of a coil spring which is not tightly wound (a coil spring whose winding parts are separated from each other), and compressible in the front and rear direction. The second small diameter part **71** is composed of a tightly wound coil spring (a coil spring whose winding parts are in contact with each other), and is not compressible in the front and rear direction. The second small diameter part **71** has the outer diameter smaller than the second large diameter part **70**. A front end part **71**Fr of the second small diameter part **71** is in contact with a rear end part **51**Rr of the first small diameter part **51** of the first spring terminal **48**. That is, the front end part **71**Fr of the second small diameter part **71** and the rear end part **51**Rr of the first small diameter part **51** of the first spring terminal **48** form a high-voltage contact B.

The second holding member **44** is made of a resin having a high electric insulating property, for example. As shown in FIG. **6**, the second holding member **44** includes a second holding member main body **80** which is elongated along the left and right direction, four terminal holding parts **81** which are provided at an upper part of the second holding member main body **80**, a board side spring terminal housing **82** which is provided at a lower right corner part of the second holding member main body **80**, and a cylindrical second housing **83** provided at a right end part of the second holding member main body **80**.

At the right end part of the second holding member main body **80**, a supporting plate part **84** is provided, and, at a front side of this supporting plate part **84**, the second conductive wire **67** of the second connecting member **43** is arranged. Each terminal holding part **81** includes three terminal housing parts **85**, and, in each terminal housing part **85**, a terminal **90** is housed. In the board side spring terminal housing **82**, the board side spring terminal **66** of the second connecting member **43** is housed.

As shown in FIG. **4**, in the second housing **83**, the second spring terminal **68** of the second connecting member **43** is housed. The second housing **83** includes a second large diameter part insertion part **86**, a second small diameter part insertion part **87** which is provided at a front side of the second large diameter part insertion part **86**, and a connection part **88** which is arranged between the second large diameter part insertion part **86** and the second small diameter part insertion part **87**. Into the second large diameter part insertion part **86**, the second large diameter part **70** of the second spring terminal **68** is inserted. Into the second small diameter part insertion part **87**, the second small diameter part **71** of the second spring terminal **68** is inserted. The second small diameter part insertion part **87** has a smaller inner diameter than the second large diameter part insertion part **86**. The diameter of the connection part **88** is gradually reduced toward the front side (to a side of the second small diameter part insertion part **87**). As shown in FIG. **7**, at a front end part of the second housing **83**, a pair of upper and lower protrusions **89** are formed so as to protrude forward.

In the color printer **1** applying the above-mentioned configuration, an AC current supplied from the power supply board (not shown) to the high-voltage board **36** is subjected to DC conversion and high-voltage conversion and is converted into a high-voltage current by the secondary transferring transformer **37** of the high-voltage board **36**. As indicated by an arrow I in FIG. **2**, this high-voltage current is supplied from the secondary transferring transformer **37** of the high-voltage board **36** to the secondary transferring unit **18** through the first and second connecting members **40** and **43**. Thus, the first and second connecting members **40** and **43** are arranged in a current path from the high-voltage board **36** to the secondary transferring unit **18**.

Next, an assembly of the connecting mechanism **39** will be described.

As shown in FIG. **8**, in a state before the connecting mechanism **39** is assembled (a state before the first and second holding members **41** and **44** are coupled with the coupling member **42**), the length of the boss part **56** of the first holding member **41** in the front and rear direction is shorter than the length of the first large diameter part **50** of the first spring terminal **48** in the front and rear direction by a length L. According to this, it is possible to freely deform the first small diameter part **51** of the first spring terminal **48** with respect to the boss part **56** of the first holding member **41**. In addition, the length L is a length which allows compression of the first large diameter part **50**.

When the connecting mechanism **39** is assembled, as shown in FIG. **9**, the first holding member **41** which is holding the first connecting member **40** is held at the front side of the rear side frame **32** of the printer main body **2**. Further, with inserting the first spring terminal **48** of the first connecting member **40** in the first housing **60** of the coupling member **42**, the first holding member **41** is coupled with the coupling member **42**. In this regard, when the first holding member **41** is coupled with the coupling member **42** from the front side, the extending part **54** and the holding plate part **55** of the first holding member **41** interfere with the side plate **35** of the printer main body **2**. Hence, as indicated by an arrow C in FIG. **9**, the first holding member **41** is coupled with the coupling member **42** from the upper front side.

In this case, it is possible to freely deform the first small diameter part **51** of the first spring terminal **48** with respect to the boss part **56** of the first holding member **41** as described above. Consequently, as shown in FIG. **10**, while greatly deforming the first small diameter part **51** of the first spring terminal **48** downward, it is possible to insert the first spring terminal **48** in the first housing **60** of the coupling member **42**. According to this, it is possible to easily insert the first spring terminal **48** in the first housing **60**, and easily coupling the first holding member **41** to the coupling member **42**.

When the first holding member **41** is coupled with the coupling member **42**, as shown in FIG. **11**, the first large diameter part **50** of the first spring terminal **48** is partially inserted into the first insertion part **62** of the first housing **60**, and the first small diameter part **51** of the first spring terminal **48** is partially inserted into the second insertion part **63** of the first housing **60**. Further, when a rear end part **50**Rr of the first large diameter part **50** and the second contact part **64** of the first housing **60** come into contact with each other so as to compress the first large diameter part **50**, a front end part **51**Fr of the first small diameter part **51** and the first contact part **57** of the boss part **56** of the first holding member **41** come into contact with each other. According to this, the elastic force of the first large diameter part **50** stops working on the first small diameter part **51**, and movement of the first small diameter part **51** in the front and rear direction is restricted.

Further, when the first holding member **41** is coupled with the coupling member **42** as described above, as shown in FIG. **12**, the first spring terminal **48** penetrates the first housing **60**, and the rear end part **51**Rr of the first small diameter part **51** of the first spring terminal **48** protrudes to the rear side of the rear side frame **32** of the printer main body **2** and the first housing **60**.

Next, as shown in FIG. **4**, the front end part of the second housing **83** of the second holding member **44** is placed to come into contact with the rear end part of the first housing **60** of the coupling member **42** so as to couple the second holding member **44** to the coupling member **42**. According to this, the rear end part **51**Rr of the first small diameter part **51** of the first spring terminal **48** is inserted into the second small diameter part insertion part **87** of the second housing **83** so as to come into contact with the front end part **71**Fr of the second small diameter part **71** of the second spring terminal **68**. Thus, the high-voltage contact B formed by the first small diameter part **51** and the second small diameter part **71** is formed in the second small diameter part insertion part **87** of the second housing **83**. Consequently, it is possible to prevent misalignment of the second holding member **44** with respect to the coupling member **42**, and enhance a coupling strength of the coupling member **42** and the second holding member **44**.

In the present embodiment, as described above, the first holding member **41** is provided with the first contact part **57** which comes into contact with the front end part **51**Fr (the end part at the side of the first large diameter part **50**) of the first small diameter part **51** of the first spring terminal **48** in a state where the first holding member **41** is coupled with the coupling member **42**, and the coupling member **42** is provided with the second contact part **64** which comes into contact with the rear end part **50**Rr (the end part at the side of the first small diameter part **51**) of the first large diameter part **50** of the first spring terminal **48** in a state where the first holding member **41** is coupled with the coupling member **42**. By applying this configuration, it is possible to prevent a spring pressure of the first spring terminal **48** from having influence on the pressure of the high-voltage contact B composed of the first and second spring terminals **48** and **68**. Hence, it is possible to set the pressure of the high-voltage contact B based only on the spring pressure of the second spring terminal **68**, and easily and precisely set the pressure of the high-voltage contact B.

Further, the first contact part **57** is arranged at the rear end face (distal end face) of the boss part **56** of the first holding member **41**. By applying this configuration, it is possible to form the first contact part **57** while applying a simple configuration.

Further, the second contact part **64** is arranged between the first insertion part **62** and the second insertion part **63** of the first housing **60** of the coupling member **42**. By applying this configuration, it is possible to form the second contact part **64** while applying a simple configuration.

Further, the second spring terminal **68** includes the second large diameter part **70** which is composed of a compressible coil spring and the second small diameter part **71** which is composed of a tightly wound coil spring, has the smaller outer diameter than the second large diameter part **70** and is contactable with the first small diameter part **51**. By applying this configuration, it is possible to reliably place the first spring terminal **48** and the second spring terminal **68** in contact with each other.

Further, in the present embodiment, the secondary transferring unit **18** which secondarily transfers a toner image on the intermediate transferring belt **6** to a sheet is used as a unit. By applying this configuration, it is possible to reliably supply a high-voltage current to the secondary transferring unit **18** from the high-voltage board **36**.

In the present embodiment, the secondary transferring unit **18** including the secondary transferring roller **19** is used as a unit. In another embodiment, an intermediate transferring unit including the intermediate transferring belt **6**, an exposure unit including the exposure device **7**, a photosensitive drum unit including the photosensitive drum **9**, a developing unit including the developing device **11** or a fixing unit including the fixing device **20** or the like may be

used as a unit. That is, every unit which is used for an image forming process on the sheet may be used as a unit.

In the present embodiment, the second spring terminal **68** is composed of the second large diameter part **70** composed of the compressible coil spring and the second small diameter part **71** composed of the tightly wound coil spring. In another embodiment, the second spring terminal **68** may be composed only of a compressible coil spring.

In the present embodiment, the configuration of the present disclosure is applied to the color printer **1**. In another embodiment, the configuration of the present disclosure may be applied to another image forming apparatus, such as a monochrome printer, a copying machine, a facsimile or a multifunction peripheral.

While the present disclosure has been described with reference to the particular illustrative embodiments, it is not to be restricted by the embodiments. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the present disclosure.

What is claimed is:

1. An image forming apparatus comprising:

a unit used for an image forming process on a recording medium;

a high-voltage board configured to supply a high-voltage current to the unit; and

a connecting mechanism configured to electrically connect the high-voltage board and the unit,

wherein the connecting mechanism includes:

a first connecting member including a first spring terminal;

a first holding member configured to hold the first connecting member;

a coupling member with which the first holding member is coupled; and

a second connecting member including a second spring terminal configured to be contactable with the first spring terminal,

the first spring terminal includes:

a first large diameter part composed of a compressible coil spring; and

a first small diameter part composed of a tightly wound coil spring and configured to be contactable with the second spring terminal,

wherein an outer diameter of the first small diameter part is smaller than an outer diameter of the first large diameter part, and

the first holding member has a first contact part configured to come into contact with an end part of the first small diameter part at a side of the first large diameter part in a state where the first holding member is coupled with the coupling member, and

the coupling member has a contact portion configured to come into contact with an end part of the first large diameter part at a side of the first small diameter part in the state where the first holding member is coupled with the coupling member,

wherein the coupling member includes:

a first insertion part into which at least a part of the first large diameter part is insertable; and

a second insertion part into which at least a part of the first small diameter part is insertable,

wherein an inner diameter of the second insertion part is smaller than an inner diameter of the first insertion part, and

the contact portion is arranged between the first insertion part and the second insertion part,

wherein a diameter of the contact portion is gradually reduced toward a side of the second insertion part.

2. The image forming apparatus according to claim **1**,

wherein the first holding member includes:

a holding plate part extending along a direction crossing to an axial center direction of the first spring terminal; and

a boss part extending from the holding plate part along the axial center direction of the first spring terminal,

the first large diameter part is attached to an outer circumference of the boss part,

the first contact part is arranged at an end face of the boss part.

3. The image forming apparatus according to claim **2**,

wherein a length of the boss part in the axial center direction of the first spring terminal is shorter than a length of the first large diameter part in the axial center direction of the first spring terminal in a state before the first holding member is coupled with the coupling member.

4. The image forming apparatus according to claim **1**, further comprising a second holding member configured to hold the second connecting member and coupled with the coupling member,

wherein a part of the first small diameter part is inserted into the second holding member so as to come into contact with the second spring terminal in a state where the second holding member is coupled with the coupling member.

5. The image forming apparatus according to claim **1**,

wherein the second spring terminal includes:

a second large diameter part composed of a compressible coil spring; and

a second small diameter part composed of a tightly wound coil spring and configured to be contactable with the first small diameter part,

wherein an outer diameter of the second small diameter part is smaller than an outer diameter of the second large diameter part.

6. The image forming apparatus according to claim **1**, further comprising an image carrier to which a toner image is primarily transferred,

wherein the unit is a secondary transferring unit configured to secondarily transfer the toner image on the image carrier to a recording medium.

7. The image forming apparatus according to claim **1**, wherein the second spring terminal is arranged coaxially with the first spring terminal.

8. The image forming apparatus according to claim **1**, further comprising an apparatus main body configured to house the unit,

wherein the coupling member is fixed to the apparatus main body.

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